

AMENDMENTS TO THE SPECIFICATION

Please replace paragraphs [0027] - [0030] and [0035] with the following amended paragraphs:

a1 [0027] Diametrically opposed left side coupling legs 860 on shift sleeve 732 contact the diametrically opposed right side coupling legs 808 on shift sleeve 720 (as shown in Fig. 14), and diametrically opposed right side coupling legs 868 on shift sleeve 732 nonrotatably extend through coupling recesses 872 in pawl control washer 736 and through opening 876 in bearing cone 102 and nonrotatably engage complementary shift sleeve coupling recesses 880 in actuator plate 104. Thus, shift sleeve 732, pawl control washer 736 and actuator plate 104 rotate as a unit. However, shift sleeve 732 can rotate clockwise relative to shift sleeve 720 and pawl support 728 as discussed more fully below. Since return spring 716 biases spring washer 712 clockwise relative to spring washer 724, since spring washer 712 is coupled to pawl support 728 through shift sleeve 720, and since pawl support 728 control washer 736 is coupled to actuator plate 104 through shift sleeve 732, actuator plate 104 also has a net clockwise bias as shown schematically in Fig. 10. Given the initial clockwise start position of actuator plate 104, the transmission paths in power transmitting mechanism 82 are subsequently selected by rotating actuator plate 104 counterclockwise.

a2 [0028] ~~Shift/assist mechanism 90 further comprises a~~ A power control mechanism 950 850 that controls the amount of power communicated from driver 70 to shift control sleeve 288 to avoid damage to shift control sleeve 288 in the event shift control sleeve 288 is unable to complete the shift. As shown more clearly in Figs. 8 and 9, power control mechanism 850 950 comprises an annular assist cam 854 954 maintained in place by an annular stopper plate 858 958 and a lock ring 862 962, a pair of annular first power control members 866 966 operatively coupled for rotation with driver 70, a pair of annular second power control members 870 970 operatively coupled for rotation with assist cam 854 954, and a power control biasing device in the form of a pair of wave washers 874 974 for biasing first power control members 866 966 and second power control members 870 970 toward each other.

63 [0029] As shown in Fig. 11, assist cam 854 954 includes a plurality of ratchet teeth 878 978 disposed on an inner peripheral surface 882 982 for engaging pawls 820 in a manner described below, and a plurality of assist cam splines 886 986 disposed on an outer peripheral surface 890 990. As shown in Fig. 12, each first power control member 866 966 includes a plurality of first power control member splines 894 994 disposed on an outer peripheral surface 898 998. First power control member splines 894 994 slidably engage a corresponding plurality of driver splines 902 1002 formed on an inner peripheral surface of driver 70 so that first power control member 866 966 rotates together with driver 70 but is capable of axial movement relative to driver 70. As shown in Fig. 13, second power control member 870 970 includes a plurality of second power control member splines 906 1006 disposed on an inner peripheral surface 910 1010. Second power control member splines 906 1006 slidably engage the plurality of assist cam splines 886 986 on assist cam 854 954 so that second power control member 870 970 rotates together with assist cam 854 954 but is capable of axial movement relative to assist cam 854 954. Second power control member 870 970 also includes a plurality of circumferentially disposed openings 914 1014 that can serve to retain a lubricating grease.

64 [0030] In the assembled state, first power control members 866 966 interleave with second power control members 870 970 and are pressed together by wave washers 874 974 so that first power control members 866 966 and second power control members 870 970 contact each other. Thus, driver 70, first power control members 866 966 second power control members 870 970 and assist cam 854 954 rotate together as a unit unless assist cam 854 954 and second power control members 870 970 significantly resist the rotation of driver 70 and first power control members 866 966 whereupon the frictional contact force between first power control members 866 966 and second power control members 870 970 is overcome and assist cam 854 954 and second power control members 870 970 rotate relative to driver 70 and first power control members 866 966. In general, and not to be limited thereto, actuator plate 104 and shift control sleeve 288 can be considered an example of a shift mechanism, and return spring 716, shift sleeve 720, shift sleeve 732, pawl support 728, pawls 820, pawl bias springs 828 and pawl control washer 736 can be considered an example of a shift assist mechanism.

25 [0035] As noted previously, shift/assist mechanism 90 also uses the rotational power of driver 70 to help change the power transmission paths in power transmitting mechanism 82. This is desirable when significant drive force is applied to sprocket 54 and causes great resistance to the coupling or uncoupling of the various components. During normal operation, actuator plate 104, shift sleeve 732, pawl control washer 736, pawl support 728, shift sleeve 720, spring washer 712, shift key member guide 704 and shift control sleeve 288 rotate as a unit to couple and uncouple the various components. As a result, the positions of coupling legs 860 of shift sleeve 732, pawl control ledges 850 of pawl control washer 736, pawls 820 and coupling legs 808 of shift sleeve 720 are as shown in Fig. 14. In this state pawls 820 are disengaged from ratchet teeth 878 978 on assist cam 854 954. However, when significant drive force is applied to sprocket 54 and causes significant resistance to the operation of shift control sleeve 288, shift control sleeve 288 tends to remain stationary despite rotation of actuator plate 104. In this case shift sleeve 732 rotates clockwise relative to shift sleeve 720, thus causing pawl control washer 736 to rotate clockwise relative to pawl support 728 so that pawl control ledges 850 move away from pawls 820 as shown in Fig. 15. As a result, pawls 820 rotate radially outwardly and engage ratchet teeth 878 978 on assist cam 854 854 so that pawl support 728 rotates together with assist cam 854 854 and driver 70. This, in turn, provides an assisting force to rotate shift sleeve 720, shift key member guide 704 and shift control sleeve 288 to complete the shifting operation. When the resistance from shift control sleeve 288 is overcome, pawl support 728 rotates clockwise relative to pawl control washer 736 as shown in Fig. 16 until the shift operation is complete and the state resumes to that shown in Fig. 14. As noted previously, driver 70, first power control members 866 966, second power control members 870 970 and assist cam 854 954 rotate together as a unit unless assist cam 854 954 and second power control members 870 970 significantly resist the rotation of driver 70 and first power control members 866 966. That would happen if shift control sleeve 288 is unable to rotate or otherwise complete the shift. To avoid damage to the components, the frictional contact force between first power control members 866 966 and second power control members 870 970 is overcome upon such excessive resistance so that assist cam 854 954 and second power control members 870 970 rotate relative to driver 70 and first power control members 866 966. The shift then can complete when the rider decreases the pedal resistance and the components can operate normally.